CLAIMS

We Claim:

1. A method to determine a position of a stage, comprising:

capturing images of a plurality of targets located on the stage;

comparing the captured images of the plurality of targets with stored images to determine displacement coordinates for each target; and,

translating the displacement coordinates for the targets into position coordinates for the stage.

2. A method as in claim 1 wherein capturing images includes:

illuminating the plurality of targets.

3. A method as in claim 1 wherein the plurality of targets includes three targets.

4. A method as in claim 1 wherein the capture of the images is performed by a plurality of sensors, one sensor for each target.

5. A method as in claim 1 wherein comparison of the captured images of the plurality of targets with the stored images is performed by imaging chips within a plurality of sensors, one sensor for each target.

6. A method as in claim 1 wherein there are two displacement coordinates for each target.

7. A method as in claim 1 wherein there are six position coordinates for the stage.

8. A method as in claim 1 wherein the targets are placed at oblique angles to all surfaces of the stage.

9. A method as in claim 1:

wherein each target is placed so a target plane for each target is at an oblique angle to all surfaces of the stage;

wherein the capture of the images is performed by a plurality of sensors; and,

wherein for each target, a sensor from the plurality of sensors is aligned nominally perpendicular to the target plane.

10. A method as in claim 1 wherein there are six position coordinates for the stage, the six position coordinates being:

translational movement along a first axis;

translational movement along a second axis;

translational movement along a third axis;

rotational movement about the first axis;

rotational movement about the second axis; and,

rotational movement about the third axis.

11. A system to determine a position of a stage, comprising:

capturing hardware that captures an image for each of a plurality of targets located on the stage; and,

processing software that compares the captured images of the plurality of targets with stored images to determine displacement coordinates for each of the plurality of targets and translates the displacement coordinates for the targets into position coordinates for the stage.

12. A system as in claim 11 wherein the capturing hardware includes a plurality of light sources that illuminate each of the plurality of targets.

13. A system as in claim 11 wherein the plurality of targets includes three targets.

14. A system as in claim 11 wherein the capturing hardware is located in a plurality of sensors, one sensor for each target.

15. A system as in claim 11 wherein there are two displacement coordinates for each target.

16. A system as in claim 11 wherein there are six position coordinates for the stage.

17. A system as in claim 11 wherein the position coordinates for the stage are absolute coordinates from a reference location.

18. A system as in claim 11 wherein there are six position coordinates for the stage, the six position coordinates being:

translational movement along a first axis;

translational movement along a second axis;

translational movement along a third axis;

rotational movement about the first axis;

rotational movement about the second axis; and,

rotational movement about the third axis.

19. A system to determine a position of a stage, comprising:

capturing means for capturing an image for each of a plurality of targets located on the stage; and,

processing means for comparing the captured images of the plurality of targets with stored images to determine displacement coordinates for each of the plurality of targets and translating the displacement coordinates for the targets into position coordinates for the stage.

20. A system as in claim 19 wherein there are six position coordinates for the stage, the six position coordinates being:

translational movement along a first axis;

translational movement along a second axis;

translational movement along a third axis;

rotational movement about the first axis;

rotational movement about the second axis; and,

rotational movement about the third axis.